Top Secret

[redacted]

DIRECTORATE OF
INTELLIGENCE

Industrial Facilities
(Non-Military)

# *Basic Imagery Interpretation Report*

**Salavat Petroleum Refinery and**

**Chemical Combine**

**Salavat, USSR**

[redacted]

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
Imagery Analysis Service

| INSTALLATION OR ACTIVITY NAME | | COUNTRY |
|---|---|---|
| Salavat Petroleum Refinery and Chemical Combine | | UR |
| UTM COORDINATES | GEOGRAPHIC COORDINATES | 25X1 |
| 40UDE265195 | 53-24-29N 055-53-59E | |
| MAP REFERENCE | | |
| 8th RTS. USATC, Series 200, Sheet M0165-20HL, 3rd ed, Jul 68, Scale 1:200,000 (SECRET) | | 25X1 |
| LATEST IMAGERY USED | NEGATION DATE (If required) | 25X1 |
| | NA | |


ABSTRACT

The Salavat Petroleum Refinery and Chemical Combine consists of a medium-size refinery and a large petrochemical plant. It is one of two refineries in the Salavat-Ishimbay area. Only the petroleum refinery is discussed in detail in this report.

The major production facilities of the refinery include crude oil distillation units, thermal and catalytic cracking units, an alkylation unit, probable catalytic reforming-hydrotreating units, possible gas fractionation units, and a possible polymerization unit. There are also several unidentified secondary processing units. The products of the refinery include straight-run, cracked, and blended gasolines in a wide range of octane ratings, kerosene, and diesel and fuel oils. Petrochemicals and petrochemical feedstocks are also produced in the refinery. These are probably further processed in the petrochemical portion of the combine.

The refinery was operating when it was first seen on satellite photography in April 1962. At that time, the four crude oil distillation units and many of the secondary processing units were complete. Construction of additional secondary processing units has continued. When the refinery was last seen in June 1969, unidentified facilities were under construction in two major areas.

The petrochemical plant was about 75 percent complete and operating in April 1962. Four additional processing units were observed under construction in August 1968 and they were still being constructed in June 1969.

The refinery and the petrochemical plant were in operation on all coverage from April 1962 through June 1969.

This report includes a photograph of the combine, a detailed line drawing of the refinery, a listing of facilities and equipment in the refinery with measurements of storage tanks, and a discussion of the refinery facilities.




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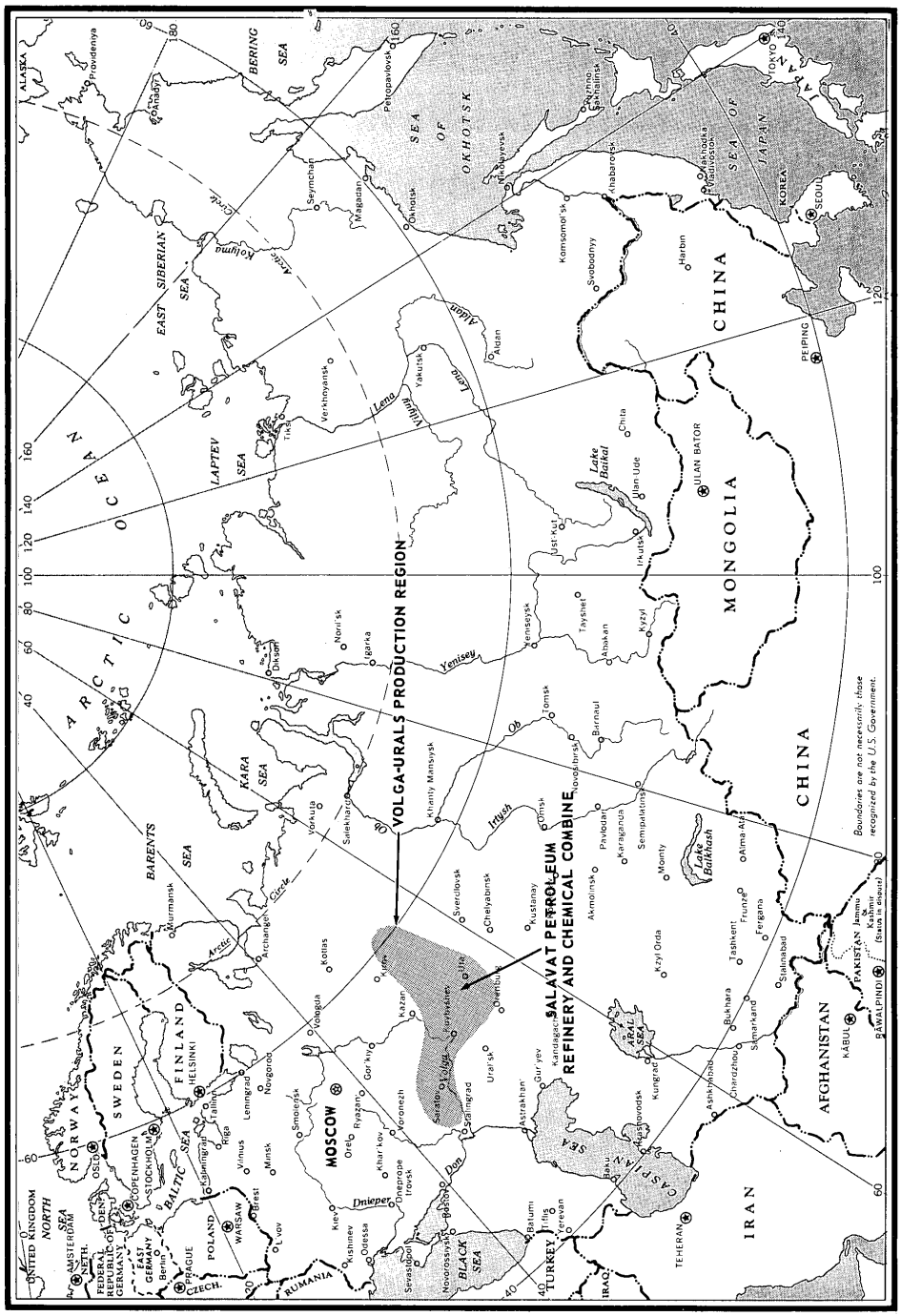


*FIGURE 1. LOCATION MAP.*

## INTRODUCTION

Salavat Petroleum Refinery and Chemical Combine is a large complex consisting of a petroleum refinery and a petrochemical plant. It is located 2 nautical miles (nm) northwest of Salavat and 6 nm southwest of Ishimbay (see Figure 1). The combine is 5 nm southwest of the Ishimbay Petroleum Refinery Peregonnyy 25X1 and 5.5 nm east of the Ishimbay Natural Gas Products Plant Gasovy 25X1 The Salavat refinery began operating in 1955. 1/

Rail service into the combine is provided by a spur from the main line between Sterlitamak and Orenburg. Crude oil to charge the refinery comes by pipeline and rail from the Volga-Urals production region. 1/

Electric power and steam are supplied by the collocated Salavat Heat and Thermal Power Plant Novosalavat TETS 2 and Salavat Heat and Therm 25X1 Power Plant TETS 1 25X1

## BASIC DESCRIPTION

### Physical Features

The combine measures approximately 18,000 by 11,500 feet and covers about 4,500 acres. The refinery and storage areas occupy approximately 1,400 acres (see Figures 2 and 3). Walls secure the entire facility.

### Operational Functions

This is a medium-size Soviet refinery with respect to charge capacity. The major refining units presently in operation include four crude oil distillation units, three catalytic and three thermal cracking units, an alkylation unit, two probable catalytic reforming-hydrotreating (CR-HT) units, four possible gas fractionation units, and a possible polymerization unit. There are also several unidentified secondary processing units.

Based on the identification of processing units, the products of this refinery include straight-run, cracked and blended gasolines in a wide range of octane ratings, kerosene, and diesel and fuel oils. Petrochemicals and petrochemical feedstocks are also produced in the refinery. These are probably further processed in the petrochemical portion of the combine. The petrochemical processes have not been identified and the products are not known.

### Construction and Operational Status

The refinery was operating when it was first seen on photography in April 1962. At that time, the crude oil distillation units, the catalytic and thermal cracking units, the alkylation unit, the four possible gas fractionation units, and the possible polymerization unit were all complete. Most of the storage tanks were also in place.

By September 1962 work had just begun on one probable CR-HT unit in Area S. Photography of July 1963 showed that the probable CR-HT unit was in the midstage of construction and the storage and shipping facilities in Area A were in the early stages. By September 1964 the probable CR-HT unit was completed.

In August 1966, one unidentified secondary processing unit was complete and two more were in the late stages of construction in Area R. The possible blending unit in Area E was in the midstage of construction and the second probable CR-HT unit in Area S was in the early stages. Work was continuing on the storage and shipping facilities in Area A.

By August 1968, the possible blending unit and the second and third unidentified units in Area R were complete. The second probable CR-HT unit was in the midstage of construction and unidentified facilities south of Area E were in the early stages of construction.

In March 1969, the probable CR-HT unit and the storage and shipping facilities in Area A were nearly complete. Unidentified facilities between Areas J and K were in the early stages of construction. By April 1969 the probable CR-HT unit was complete. On the latest available photography, in June 1969, construction was continuing on the storage and shipping facilities in Area A and on the unidentified facilities south of Area E and between Areas J and K.

The petrochemical plant was about 75 percent complete and operating on the April 1962 photography. Little additional construction activity was noted until August 1968. At that time four additional processing units were observed under construction in the southern part of the plant and they were still under construction in June 1969.

The refinery and the petrochemical plant were in operation on all coverage from April 1962 through June 1969.

## Facilities and Equipment

Table 1 lists the functional areas and equipment within the refinery. In areas which are still under construction and whose function is undetermined, the buildings and processing equipment are not listed in the table or shown on Figure 3. All measurements are rounded to the nearest half-meter.

Table 1. Equipment and Facilities at the Salavat Petroleum Refinery and Chemical Combine (Keyed to Figure 3)

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| A | Storage and Shipping | 2 Loading racks<br>14 Miscellaneous buildings<br>12 Cylindrical storage tanks, 24 meters in diameter<br>20 Horizontal storage tanks, 24 meters long<br>15 Spherical storage tanks, [redacted] 25X1<br>4 Tank bases |
| B | Storage and Shipping | 2 Loading racks<br>33 Miscellaneous buildings<br>42 Cylindrical storage tanks<br>5 24-meter-diameter<br>20 18-meter-diameter<br>10 [redacted] 25X1<br>3 9-meter-diameter<br>4 [redacted] 25X1<br>33 Horizontal storage tanks<br>13 24-meter-long<br>8 [redacted] 25X1<br>12 12-meter-long<br>2 Semiburied storage tanks (not measured) |
| C | Crude Oil Storage and Desalting<br>(1) Crude Oil Storage | 9 Support buildings<br>48 Cylindrical storage tanks, 24 meters in diameter<br>4 Semiburied storage tanks (not measured) |

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| C (Cont) | (2) Desalting | 1 Unit with<br>2 desalting spheres<br>6 horizontal desalting drums<br>1 cluster of processing equipment<br>1 bank of heat exchangers<br>1 processing building<br>4 cylindrical storage tanks, 3 meters in diameter<br>4 Units, each with<br>1 bank of heat exchangers<br>2 processing buildings<br>2 horizontal processing/ settling tanks<br>3 cylindrical storage tanks, 3 meters in diameter<br>2 units have 2 support buildings<br>9 Support buildings<br>1 Water storage basin |
| D | Storage and Water Treatment<br>(1) Storage | 17 Miscellaneous buildings<br>21 Cylindrical storage tanks<br>20 24-meter-diameter<br>1 6-meter-diameter<br>2 Semiburied storage tanks (not measured)<br>2 Tank bases |
| | (2) Water Treatment | 11 Miscellaneous buildings (one with three [redacted] diameter storage tanks) 25X1<br>4 Cylindrical storage tanks<br>2 [redacted] 25X1<br>2<br>1 Semiburied storage tank (not measured)<br>2 Tank bases<br>38 Water treatment basins |
| E | Water Cooling and Possible Blending<br>(1) Possible Blending | 1 Unit with<br>10 possible blending tanks<br>5 processing buildings<br>1 cooling tower<br>6 support buildings<br>1 shipping building<br>3 cylindrical storage tanks, 6 meters in diameter<br>1 gasholder, 15 meters in diameter |
| | (2) Water Cooling | 2 Support buildings (one of which is under construction)<br>4 Cooling towers |

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| F | Unidentified Secondary Processing | 1 Unit with<br>10 short processing towers<br>1 processing building<br>1 cylindrical storage tank, [redacted] 25X1<br>5 horizontal storage tanks, 9 meters long<br>1 Unit with<br>3 clusters of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 pipe furnace<br>4 processing buildings<br>1 support building<br>4 horizontal storage tanks, 9 meters long |
| G | Thermal Cracking | 2 Units, each with<br>6 columns (2 of which are for vapor recovery)<br>3 banks of heat exchangers/ cooling coils/accumulators<br>2 pipe furnaces<br>1 pump building<br>1 compressor building<br>1 support building<br>2 cylindrical storage tanks, 3 meters in diameter<br>2 horizontal storage tanks, [redacted] 25X1<br>14 Support buildings<br>20 Cylindrical storage tanks<br>15 [redacted] 25X1<br>5 6-meter-diameter |
| H | Water Cooling | 6 Support buildings (one of which is under construction)<br>9 Cooling towers |
| I | Blending, Possible Extraction, and Possible Polymerization<br>(1) Possible Polymerization | 1 Unit with<br>5 columns<br>3 clusters of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>2 pipe furnaces<br>1 processing building<br>2 pump/compressor buildings<br>1 support building<br>2 cylindrical storage tanks, 3 meters in diameter<br>2 horizontal storage tanks<br>1 [redacted] 25X1<br>1 |

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| I (Cont) | (2) Possible Extraction | 1 Unit with<br>4 columns<br>3 clusters of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 compressor building<br>2 support buildings<br>3 horizontal storage tanks, [redacted] 25X1<br>2 gasholders, 18 meters in diameter |
| | (3) Blending and Treating | 1 Unit with<br>12 blending/treating towers<br>12 horizontal blending/treating tanks<br>1 processing building<br>2 Support buildings (one of which is under construction) |
| J | Possible Gas Fractionation | 1 Unit with<br>5 columns<br>2 clusters of processing equipment<br>1 compressor building<br>5 Support buildings |
| K | Alkylation | 1 Unit with<br>5 columns (include a debutanizer, deisobutanizer, depropanizer, and a rerun column)<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 reactor building<br>1 settler and acid recovery building with 6 horizontal tanks<br>1 caustic reclamation building with 1 horizontal tank<br>6 cylindrical surge, recycle, and feedstock tanks<br>1 distillation building<br>1 pump building<br>2 horizontal acid tanks |
| L | Storage and Water Cooling | 13 Miscellaneous buildings (one of which is under construction)<br>8 Cooling towers<br>93 Cylindrical storage tanks<br>2 [redacted] 25X1<br>6 12-meter-diameter<br>66 6-meter-diameter<br>19 [redacted] 25X1<br>28 Horizontal storage tanks, [redacted] 25X1<br>18 Spherical storage tanks, [redacted] 25X1<br>1 Water storage basin<br>5 Tank bases |

25X1

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| M | Crude Oil Distillation | 3 Units, each with<br>1 atmospheric column<br>1 vacuum column<br>10 other columns (6 of which are probably recycle columns)<br>2 banks of heat exchangers/ cooling coils/accumulators<br>2 pipe furnaces<br>1 processing building with 7 horizontal tanks<br>1 pump building<br>6 cylindrical storage tanks, 3 meters in diameter<br>1 Unit with<br>1 atmospheric column<br>1 vacuum column<br>4 other columns<br>4 banks of heat exchangers/ cooling coils/accumulators<br>4 pipe furnaces<br>1 processing building with 6 horizontal tanks and 8 associated cylindrical storage/processing tanks)<br>1 pump building<br>9 cylindrical storage tanks<br>3 [redacted] 25X1<br>6 3-meter-diameter |
| N | Thermal Cracking | 1 Unit with<br>6 columns (2 of which are for vapor recovery)<br>3 banks of heat exchangers/ cooling coils/accumulators<br>2 pipe furnaces<br>1 pump and compressor building<br>1 support building<br>1 Unidentified unit with<br>1 probable processing building with 2 cylindrical and 3 horizontal storage/processing tanks |
| O | Unidentified Secondary Processing | 1 Unit with<br>1 column<br>2 banks of heat exchangers/ cooling coils/accumulators<br>1 pipe furnace<br>1 processing building with 3 horizontal tanks<br>1 pump building<br>12 cylindrical storage tanks<br>10 9-meter-diameter<br>.2 3-meter-diameter<br>1 horizontal storage tank, 12 meters long |

25X1

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| P | Possible Gas Fractionation | 1 Unit with<br>6 columns<br>6 short probable processing columns<br>1 cluster of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 processing building<br>1 compressor building<br>1 Unit with<br>4 columns<br>4 short probable processing columns<br>1 cluster of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 compressor building<br>1 control building<br>1 Unit with<br>13 columns<br>3 clusters of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 compressor building<br>5 processing buildings<br>1 Unidentified unit with<br>4 columns<br>9 short probable processing columns<br>2 processing buildings<br>2 Support buildings<br>3 Gasholders, 18 meters in diameter |
| Q | Storage | 2 Support buildings<br>81 Cylindrical storage tanks<br>9 [redacted] 25X1<br>4<br>18 12-meter-diameter<br>9 [redacted] 25X1<br>20 9-meter-diameter<br>9 [redacted] 25X1<br>12 |
| R | Unidentified Secondary Processing | 1 Unit with<br>3 columns<br>1 cluster of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>2 pipe furnaces<br>1 pump building<br>1 Unit with<br>2 columns<br>1 cluster of processing equipment<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 pipe furnace<br>1 pump building<br>1 processing building |

25X1

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| R (Cont) | | 1 Unit with<br>10 columns<br>3 clusters of processing equipment<br>3 banks of heat exchangers/ cooling coils/accumulators<br>6 processing buildings<br>2 cylindrical and 2 horizontal processing/storage tanks<br>8 Cylindrical storage tanks<br>4 [redacted] 25X1<br>2 12-meter-diameter<br>2 9-meter-diameter |
| S | Probable Catalytic Reforming-Hydrotreating | 2 Units, each with<br>1 probable catalytic reforming section with<br>6 reactors<br>1 cluster of processing equipment<br>4 banks of heat exchangers/ cooling coils/accumulators<br>2 pipe furnaces<br>1 pump building<br>1 probable hydrotreating section with<br>4 columns<br>1 cluster of processing equipment<br>2 processing buildings (one with 4 horizontal tanks)<br>1 pump building<br>1 cylindrical storage tank, 6 meters in diameter<br>1 Unidentified processing unit with<br>6 short processing columns<br>2 horizontal processing tanks<br>2 processing buildings<br>1 Support building<br>9 Cylindrical storage tanks [redacted] 25X1 |
| T | Unidentified Secondary Processing | 1 Unit with<br>4 columns<br>4 possible processing columns on the roof of a building<br>1 bank of heat exchangers/ cooling coils/accumulators<br>1 pipe furnace<br>2 processing buildings<br>4 cylindrical storage tanks, 3 meters in diameter<br>2 horizontal storage tanks, 12 meters long<br>1 Unit with<br>5 columns<br>1 processing building with 6 horizontal tanks<br>1 Support building |

| Area | Functional Description | Equipment and Facilities |
|---|---|---|
| U | Catalytic Cracking | 3 Thermofor (moving-bed) units, each with<br>1 column<br>1 cluster of processing equipment<br>2 banks of heat exchangers/ cooling coils/accumulators<br>1 pipe furnace<br>1 blower building with 3 blowers<br>1 pump building<br>3 support buildings<br>6 cylindrical storage tanks<br>2 [redacted] 25X1<br>4 3-meter-diameter<br>25 Cylindrical storage tanks<br>17 12-meter-diameter<br>2 [redacted] 25X1<br>4 9-meter-diameter<br>2 [redacted] 25X1 |

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REFERENCES

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Map

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Document

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Requirement

COMIREX N02
Support Number 429230

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